# Charles Darwin University

Final Examination

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| Family Name | | | | | | |
| Given Name/s | | | | | | |
| Student Number | | | | | | |
| Teaching Period | Semester 1, 2018 | | | | | |

| SPE311 – Advanced Studies in Exercise and Sport Science 1 | DURATION | |
|---|---|---|
| | | |
| | Reading Time: | 10 minutes |
| | Writing Time: | 120 minutes |
| | | |

## INSTRUCTIONS TO CANDIDATES

The examination is divided into three (3) sections. Attempt all questions.

Section A. Multiple Choice. 40 Marks. Answer on examination.
Section B. Short Answers. 20 marks. Answer on examination.
Section C. Short Essays. 40 Marks. Answer on examination.

Total marks equal 100 marks.

## EXAM CONDITIONS

You may begin writing from the commencement of the examination session. The reading time indicated above is provided as a guide only.

This is a CLOSED BOOK examination

Any calculator is permitted

No handwritten notes are permitted

No dictionaries are permitted

| ADDITIONAL AUTHORISED MATERIALS | EXAMINATION MATERIALS TO BE SUPPLIED |
|---|---|
| No additional printed material is permitted | 1 x 8 Page Book |

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## Section A

## Multiple Choice Questions

## Section B

## Short Answer Questions

Total marks for this section: 20 marks

Each question is worth two (2) marks and marks are distributed equally throughout each question.

Answer in the spaces provided.

***Suggested time allocation for Section B: 40 minutes***

### Question 1

Understanding and applying assessment and modification model principles in biomechanics has identified two intervention priorities as they relate to performance modification. List two important priorities and support your answer with one example from sport.

1._____

_____

2._____

_____

**(Marks: 2)**

### Question 2

Based on readings from your textbook focusing on talent identification and athlete profiling list the four (4) broad categories of tests conducted on athletes and provide an example of each.

1._____

_____

2._____

_____

3._____

_____

4._____

_____

**(Marks: 2)**

## Question 3

Explain the differences between static and dynamic ROM and provide examples to explain your answers.

Static

_____

_____

Dynamic

_____

_____

**(Marks: 2)**

## Question 4

Based on learning activity 2 which evaluated the relationship between body mass, muscle mass and adipose/fat mass and human torque work and power output what did you discover?

_____

_____

_____

_____

_____

**(Marks: 2)**

## Question 5

List some postural factors associated with swimming, racquet sports, cycling and mobile field sports that are thought to be associated with sport performance.

Swimming:_____

_____

Racquet:_____

_____

Cycling:_____

_____

Field:_____

_____

**(Marks: 2)**

## Question 6

Four factors have been identified in your textbook that influence force/torque/strength development. List and explain these factors. Concept of muscle stiffness.

1._____
_____

2._____
_____

3._____
_____

4._____
_____

**(Marks: 2)**

## Question 7

Angular and linear displacement training techniques can be either passive or active in terms of increasing range of movement (ROM). Explain the difference between passive and active methods.

Passive

_____
_____
_____
_____

Active

_____
_____
_____
_____

**(Marks: 2)**

## Question 8

Explain in the context of sport the biomechanical concepts of power, linear acceleration, angular displacement, angular acceleration, angular momentum and drag forces.

_____
_____
_____
_____
_____
_____
_____

**(Marks: 2)**

## Question 9

Explain the advantages and disadvantages of qualitative and quantitative analysis in biomechanics and support your answers with examples from exercise and sport.

Qualitative

_____
_____
_____
_____

Quantitative

_____
_____
_____
_____

**(Marks: 2)**

## Question 10

Based on the examples presented in lectures, tutorials and laboratories indicate the methods and steps required to develop predictive mathematical biomechanical models in swimming freestyle for the 50m, 400m and 1500m events, which links laboratory derived measures (independent variables) with performance in competition (dependent variables).

Methods_____
_____
_____
_____
_____

Steps_____
_____
_____
_____
_____

**(Marks: 2)**

This is the end of Section B (Total 20 Marks). Please ensure that you have written your name and student number on your examination sheet.

## Section C
## Extended Answer Questions

Total marks for this section: 40 marks

Each question is worth ten (10) marks. Answer in the spaces provided.

***Suggested time allocation for Section C: 40 minutes***

**Question 1**

The traditional talent identification process in Australian sport consists of five stages or steps. List and explain the five stages in the appropriate order to identify athletic potential and talented athletes.

1._____

_____

2._____

_____

3._____

_____

4._____

_____

5._____

_____

(Marks: 2 for each response)

**Question 2**

Explain the process of hierarchical modelling for qualitative analysis in sports. Select a sport and conduct a hierarchical modelling analysis.

1. Explain (5 marks)

_____

_____

_____

_____

2. Hierarchical modelling analysis **(5 marks)**

_____

_____

_____

_____

## Question 3

Sports instrumentation and technology have been applied to measure the constructs of force, torque, strength and power. Based on your lectures, your textbook, laboratories and research, explain how each construct can be measured, how they can be used to predict performance and what units of measurement are relevant to each construct.

1. Explain how each construct can be measured. **(4 marks)**

_____

_____

_____

_____

_____

2. How they can be used to predict performance. **(4 marks)**

_____

_____

_____

_____

_____

3. What units of measurement are relevant to each construct? **(2 marks)**

_____

_____

_____

_____

_____

Question 4

Image analysis via video recording systems and other technologies are now used frequently in exercise and sport science to provide research data, coaching data and visual feedback to athletes. These analyses can be 2-dimensional (2-D) or 3-dimensional (3-D). Under what situations would you use these different types of biomechanical analyses?

2-Dimensional (2-D). **(5 marks)**

_____

_____

_____

_____

_____

_____

_____

_____

3-Dimensional (3-D). **(5 marks)**

_____

_____

_____

_____

_____

_____

_____

_____

This is the end of Section C (Total 40 Marks). Please ensure that you have written your name and student number on your examination sheet.

## BIOMECHANICAL FORMULA AND CONSTANTS

$F = ma$

$PE = Wh$ or $mgh$

$W = mg$

$v = u + at$

$a = (v-u)/t$

$v = s/t$

$s = ut + \frac{1}{2}at^2$

$v^2 = u^2 + 2as$

$R = (v^2 \sin 2\theta) / g$

$d_H = v \cos \theta \times t$

$w = \theta / t$

$\alpha = (\omega_f - \omega_i) / t$

$v_T = \omega r$

$I = Ft$

$F = \mu N$

$Ft = m(v-u)$

$I = \Sigma mr^2$

$T = I\alpha$

$F_c = mv^2/r$

$H = I\omega$

$p = mv$

$g = 9.8ms^{-2}$

$F_D = \frac{1}{2}C_D\rho A_\rho v^2$

$w = Fd$

$KE = \frac{1}{2}mv^2$